Notebook, N-87-05-09

This notebook covers the period May-July 1887. It was used by Arthur C. Payne for notes on filament experiments performed at the Edison Lamp Co. in Harrison, N.J. The spine is labeled "3[6]." The book contains 38 numbered pages.

XE-172 N-87.05.09

Arthur C. Payne
Laboratory
E. L. Co.
Harrison N.J.

1 5/9/87.

Payne No 7.

In 6" evaporating dish put 20 - org 16 C.P. Cardons, filled dish ½ full H_2SO_4 (commercial) + applied heat directly to dish. As acid became heated, color of Cardons changed slightly, from shiny to dull black. Boiled acid down to ½ Vol. then allowed to cool to temp. of air. Washed Cardons in H_2O + dried by evaporation. Cardons did not twist or change shape.

5/10/87.

20. org 10. C.P. run through in exactly same way, with same results. Acid was in state of violent ebullition.

over.

Delivered to Hanson 20. 10 C.P.
as Order P. No. 8.
To be read at 10 C.P + 00 C.P
set up at 00 C.P + C.P read
a end 2 hours.
May 17th 1907.
Arthur C. Payne.

2. 5/10/07.

Payne No. 1 - Variation 7.

Immersed in a 6" evap. dish in solution 2 pct. H_2SO_4 + 1 pct. HNO_3 to 20 - mg 16 O.P. Carbons that had been treated as per exp. Payne No. 1 + applied heat directly to dish. As the solution reached boiling point a violent ebullition took place around carbons (gas being given off). Iron carbon seemed to dissolve staining the acid dark + also the vapor. In about 0 min. action around carbons ceases + solution clears off to a light green, Chromic color. Boiled to 1/2 Vol. - cooled to temp. of air slowly. Washed carbons in H_2O + dried by gentle heat. Carbons

Payne No. 1 - Var. 1.
Hel. to Hanum as Order P. - No. 4.
To be tested at 5 times normal
+ C.P. read every two hours.
5/17/87.
Arthur C. Payne.

a

3.

Payne No. 1 - Var. 1.
urine not bent. Turned slightly
darker, brownish shiny appearance.
Arthur C. Payne
5/16/87.

Payne No. 1 - Var. 2.
20. mg. 16 C.P. Castoria mix
through in same way as Payne
No. 1 - Var. 1. with same results -
except Castoria came out not
quite so black, but shiny ap-
pearance gone.
Run through as Ord. P. - No. 7.
To be tested at 5 times normal
+ C.P. read every 2 hours.
5/17/87. Arthur C. Payne

Payne No. 2.

Took 10 forms each containing 8 mg. 16. C.P. preliminaries. Fibres placed two in plumbago Crucible + filled in with small pieces of tin, as that when tin was melted, the molten metal would stand about 2 in. over forms. Forms fixed as they could not float + fibres were arranged as they could contract in N.E. way. Run through final carbonizing tube in Lawson's furnace. After taken from furnace, allowed to cool down to dull red, + just before reaching solidifying point metal poured out. Crucible immediately filled with powdered plumbago to keep out oxygen + also to prevent cooling too

Payne No 2.
as rapidly. Left until thoroughly
cooled. Found 7 broken; broke
3 in detaching the small piece
in that adhered to carbons, leaving
20 carbons in good condition.
Carbons when put in forms were
quite crooked, but during process
seem to have gotten straighter.
Came out dark + smooth - not
very shiny. The forms were cut
out at back and + about an
inch on each side to allow the
metal free access.
Returned 20 carbons to Edison
marked. Payne No 2.
14/8/96 - delivered to Hanson as
Order P No 2. To be set up at
80 C.P. + C.P. read every 2 hours.
Arthur E. Payne

Payne 3.

In 1½" gas tube put 2 oz. grms each containing 8 oz. 16 c.p. tantra filaments. Filled tube with powdered asphalt. put in furnace chamber + in 6 hours, raised it gradually to temp. of 600° Fahr. during the process, the gas + liquid asphalt are slowly forced out- of tube, + it can not easily be made airtight. Therefore, pressure inside is not very great.

Took out of oven, + cautiously unscrewed cap + allow escape of gas. + then plunged tube in boiling Linseed Oil, + kept the united asphalt became limpid

Payne 8. 7

Three removed forms + placed in Turpentine + dissolve remaining asphalt + found all carbons broken. They appeared to be well preliminarized but very rotten. In appearance were dead black. Arthur C. Payne. 8/19/87.

By same process, ran through tube containing 8 org. forms each containing 8 org. 16. C. P. filaments with same results. Carbons all broken.

8/20/87.

By same process, ran through tube containing 8 org. forms, each containing 8 org. 16. C. P. filaments with same result. Carbons all broken. Majority broke near shanks, 12 1/2 way up. Arthur C. Payne

8. 6/28/87

Payne 8.- Var. 1.

Three 16 c.p. Sawyer-Man carbons 3 reg. 16 C.P. Sawyer-Man Edison Filaments- in ½ gas lite. Filled with powdered asphalt. The filaments were put in Series without Lift- weights. Raised to 600 Volts in 8 Loops: Then plunged in boiling Linseed oil, Then cleaned in Turpentine. Carbons came out well preliminarized, smooth straight + black. Thin strong not rotten. Sent 7 carbons to Lawson to be put through final process- marked as P. 5.

Arthur C. Payne,

9 6/2/87.

Payne 3 - Var. 2.
By same process as Payne 3. Var 1.
except - temp. run up to 600°F.
in ½ hour. Cartons ~~went~~ as
well preliminarized to all
appearances as when run 8 hrs.
Sent Lawson 5 Cartons in
Forms marked P-6. to be run
through final process.
6/4/87. Received from Lawson 6
Cartons of above order.
Sent 3 to Hansen to be run
through.

Arthur C. Payne

10. 6/11/87.

Payne #6

In crucible put in reg. forms, 82 reg 16. C.P. bamboo filaments fastened down to prevent them from floating. Poured in enough mercury to cover forms then put in enough tin to cover forms & mercury were not thus. Put in furnace chamber tin 8 hrs. raised temp. from 78° F. 600° Fahr. — then put in forge & brought up to vivid white heat. Allowed to cool down, but before tin reached solidifying point it was poured off & forms immediately carried into powdered plumbago to keep off air as much as possible.

over.

11. 6/10/87.

Payne #6.
Canvas appeared rather dull
Hack - not first rate. Found
13 broken - sent 19 to Hanson
to be sewn through as Ord. P. #7.
Arthur C. Payne.

12. 6/16/87.

Order P. S.

Edisons Experiment.

Carbonized in sacaro.

Print- 12 cartons to Lawson to be run through final process.

6/17/87.

Order P. S.

12 more sent to Lawson same as above.

6/20/87. Received from Lawson & sent to Hausen 8 cartons of Print- 12.

Payne No. 4.

In Bessian crucible placed
[illegible] & raised it to red white heat.
Then by means of a rod arranged
so that ~~legend~~ molten metals could
strike all parts of fibre at once,
plunged a number of fibres in.
The crucible. Fibre oxidized. After
enough air clung to, or was in the
fibre to produce oxidation, or, they
being withdrawn while white hot
oxidized in the air. Probably oxidized
before being withdrawn, as while
they were immersed, a light flame
played upon surface of metal showing
that something was burning.

In Variation of this experiment
a fibre was dropped in so as to
Carbonize progressively. Fibre oxidized
almost before touching metal.

Wilbur C. Payne

Paper No 5.

In this experiment tube was used as shown in (Fig) consisting of iron tube, electrically insulated from cathodes, with groove to hold carbon upright, to be put in circuit with resistance, so that current might be turned on gradually. In crucible, different chemicals containing neither oxygen nor carbon, were placed & brought by heat to a molten or liquid state, then the tube containing e.g. A. Carbon plunged in & current turned on. The following results were obtained with the following chemicals:—

Fig. 7.

Chloride of Calcium:

Melted at a very high temperature (red-heat) at which point

it is a conductor of electricity: When current was turned on, a deposit was formed on each leg of the tool, on one side light gray - on the other a shiny black.

Chloride Aluminum:—
On application of heat gave of chlorine profusely & finally turned to a very fine gray powder, but turned not melt at red-heat.

Chloride Cadmium:—
Melted but on the carbon being plunged in it formed a thick crust about it.

Mercuric chloride.
Would not melt:— gave up chlorine, turned yellow & finally disappeared

Sulphur monochloride:—
Conductor of electricity:—

Tri chloride Antimony:—
Melted at Lord Kings
just as conductor of electricity.

Bromide Aluminum:—
Could not melt—gave
up bromine & turned into fine grey
powder.

Amorphous Phosphorus:—
Could not melt in
air—took fire.

Arthur C. Payne.

Tube Experiments.—

In the following experiments the object is preliminary to bamboo filaments under pressure in various chemicals & compounds. All tubes will be arranged & run alike — any variation will be stated.

They are to be arranged as follows:— In glass tube, 1 3/8" in diam. & about 10" in length sealed at one end, is inserted 20. avg. 16 C.P.— bamboo filaments in forms, with weights as they will contract in regular way, also forms so cut as to allow free circulation of the substance in which they are immersed. The open end of the tube is—

then drawn down to a narrow neck & various substances in-serted in sufficient quantity to completely cover the folums. The neck is then sealed up & the tube is completely air-tight. The tube is then placed at angle of 30.° in hot air chamber of furnace so that heat may be applied uniformly to all parts of the tube. The substances in each tube also manner of raising temperature &c. will be given in notes on the respective tubes. After sufficient application of heat they are allowed to cool slowly, then opened, contents taken out & washed in the solvent of the substances contained in tube. Then put in separate

Carbon forms marked with an order number + sent to Carbonizing Dept. for final process. after which are sent through to be put in lamps + tested as per Order to test room.

Several tubes have been run previously by Hamilton + sent through with order numbers - for particulars of which see Hamiltons notes.

Tubes run by Payne will be marked T. No. 1. T No. 2 + c as order numbers.

20. T. No. 1.

Tube of Asphalt + Linseed Oil:—

This tube contained mixture of equal parts by weight of Asphalt and Linseed Oil + was subjected to gradual rise in temperature 75° to 600° Fahr. in 8 hours. The baking act found 7 broken in Jenna Carbons were marked in Bengal, dried + put in Jenna marked as H. H. T. #4 (to be known hereafter as T. #1.) and sent to Lawson for final carbonization.

Tube well preliminarized smooth + black.

6/7/87 Received of Lawson above tube + sent 10 Carbons to Hanson to be run through. Tube smooth shiny gray in color— looked good.

Arthur C. Payne.

21. T.V.No. 2.

Mercury! —

Tube filled with mercury & gradually heated in lamp. From 78° to 600° Tahr in 1 hr. Carbons were cold preliminarized - dull black in color & quite rotten.

Sent to Lawson for final process

Rec'd H.H. 4/6 (to be known hereafter as T.V.No. 2)

Arthur C. Payar.

6/4/87

Recd. of Lawson & sent to Hansen. Was ord. to be run through to test.

6/4/62. Received from Lawson in Jones 5 cartons marked Ord. H V. #4. (see Hamilton's notes) + sent them to Lawson.

Cartons locked fine, having light smooth silvery appearance.

Arthur C. Payne

6/4/62. Received from Lawson in Jones 2 cartons marked Ord. H V. #3. (See Hamilton's notes) + sent them to Lawson.

Arthur C. Payne.

Tube of Wood-tar.

Tube contained Wood-tar. Temp. raised gradually from 73° to 600° F. in 1 hour. As tube was cooling, sealed tip cracked off allowing gas + tar to escape, also immediately cracked in middle so that nearly all of tar was forced out having carbon nearly dry. Washed carbon in Benzol. When dried, was light brown in color, not perhaps charged, + when broken up into Elementary fibers, the connecting material being almost entirely destroyed by the process. When pulled apart or crushed, fibres broke up into a fine woolly mass, very soft + to all appearance. First rate stuff out of which to make paper, or good process for preparing paper stock.

Arthur C. Payne.

Tube of Carbolic Acid.—

Tube contained Carbolic acid. Temp. raised from 76° to 600 Fah. in 1½ hrs. On taking out Fibre found them to have been acted on in much the same way as those treated in Wood-tar, the connecting substance being dissolved from between elementary fibres, which when crushed or rubbed became a woolly mass. Not quite so well done as in Wood tar.

Arthur C. Payne.

Tube of Powdered Rosin! —

Tube contained powdered rosin. Temp. raised from 73° to 600° Fahr. in 5 hours. Before rosin cooled enough to solidify, tip was broken off thus tube broken & fumes containing the fibres were immersed in [illegible] Alcohol. When dried, found to have been acted on in nearly same way as those in Mercl. Iod & Carb. acid, only elementary fibre seemed to be more brittle, & not so soft & woolly when rubbed in the fingers.

Arthur C. Payne.

Tubes of Aqueous Solutions: —

Having June + up to 10th July
I put several tubes containing H_2O.
H_2O + various substances, as Sugar,
Citric acid, Chromic Acid, Caustic
Potash, Chloride Lime &c. in various
proportions, in none of which succeeded in making Comp. high enough
or if high enough, to keep it
there long enough, to effect the
preliminary carbonization. They all
exploded between 500° + 585° Fahr.
I think the empty space in tube
was too small for the quantity
of water contained. Will try others
in which only ¼ the contents volume
of tube is occupied by water and
gases.

Arthur C. Payne.

27.

Tube of Acetic Acid: —

Tube containing Acetic acid. Temp. raised from 78° to 400° in 3 hours and kept at 400° 3 hours longer. Found fibres destroyed by action of acid — the resin being eaten out in a way similar to those treated in Hindostan &c.

Arthur C. Paynter

Tube of Anilene Oil:-

Tube contained anilene oil. Had been left standing sealed up for about three weeks before putting in furnace. Temp. raised from 75° to 300° in two hours. Then to 500° Fahr. in four hours.

Found that the fibre had almost entirely disappeared, sections being entirely eaten up or dissolved by the oil, + the part remaining was dark brown + soft having lost their fibrous structure. In some cases the fibre had entirely disappeared.

Arthur C. Payne

29.

Tube of Flowers of Sulphur.

Tube contained Flowers of Sulphur. Temp. raised from 75° to 110° in 2 hours, then to 525° in 4 hours. When cold, Sulphur had peculiar crystalline structure. Carbon marked Carbon Bi-Sulphide: was still pale in color but rotten. Rod is very frail. Did not give a clear snap when broken. Very dull black in color.

Not sent through U. S.

Arthur C. Payne.

Tube of Anthracene:—

Tube filled with anthracene.
Temp. raised from 75° to 300° in 2 hrs
+ then to 5·25° in 4 hours.
Anthracene reduced to thin glassy
crystals. very brittle + slightly yellow.
Carbons washed in benzene Sol.
Now dull black, quite tender + rotten
though well preliminarized.
The aromas substance termed to be
somewhat dissolved as in case of Naphtha
Etc. (See page 28).

Arthur C. Payne.

Tube of Iodine:—

Tube filled with re-sublimed Iodine. Temp raised from 75° to 300° Tube in 2 hrs. then to 325° in 4 hours.

Found Iodine in a solid shiny mass around Grains. Dissolved in Alcohol. Before coming in contact with alcohol Crystals appeared to be larger in section shiny — in fact the color of Iodine. As soon as Alcohol touched them they dissolved leaving only a fine powder, which, took to be Carbon: — also upon being exposed to air for two days, found filament — had diminished in size about ⅓ — half.

Arthur C. Payne

Tube of Amorphous Phosphorus.=
Tube filled with Amr. Phos.
Temp. raised from 75° to 300° in 2 hrs.
Then to 525° in 4 hours. Although
tube had been allowed to cool for
18 hours, there was still considerable
pressure inside, so that tube cracked
& exploded, damaging the fibres.
The Phosphorus appeared unaltered
The fibres were not carbonized
in the slightest degree — were a
reddish brown in color — very rotten
Arthur C. Payne.

Tube of Caustic Potash + Pyrogallic acid.

Tube contained mixture of 8 parts Caustic Potash + 2 parts Pyrogallic acid (by weight.). Temp raised from 75° to 300° Fahr. in 2 hours + then to 350° in 4 hours. Found the mixture reduced to hard, black crystalline mass very shiny + caked around sides. Dissolved in H_2O. Found the fibre had been completely oxidized - not a trace remaining.

Arthur C. Payne.

Tube of sulphide potassium:-

Tube filled with sulphide potass.

Temp. varied from 78° to 300° Fahr.
in 2 hours & then to 350° Fahr. in 4 hours.
Found sulphide in solid mass in tube
not changed in nature. Dissolved mass
& washed fibres in H_2O. Found fibres
preserved but twisted & rotten.
Connecting material seems to have been
destroyed from interior elementary fibres.

Arthur C. Paynes

34 7.#3.

Tube of Fusible Metal:—

Tube filled with fusible metal made from formula - 4 Bismuth
1 Cadmium
2 Lead
1 Tin

Temp. raised from 73° to 300° Fah. in 3 hours, then to 600° in 4 hours.

Tubes appeared to be fairly well perhaps not had cracked in one or two little. Wire strong & appeared good.

Result - 15 lb. Lamm in 3 mins. 45 secs through final process. as Ord. 7.#3.

Arthur C. Payne.

Tube of Water: —

Tube filled with H_2O, with an space slightly more than three times the space occupied by H_2O + Gases. Succeeded in causing it to erupt. of 480° Fahr. when it exploded. The glass was rendered brittle, but the test to be had.

Arthur C. Payne.

These tubes had been sealed up with the various substances in them & the fibres & fumes also, for about three weeks. On account of inability to raise tubes containing substances whose boiling points were too high to temp. high enough to preliminarize fibres, these tubes were not subjected to heat - but were broken from & those in which action had taken place on fibre are explained below:—

Tube containing 5% solution of Chromic Acid in water:— Found it had almost destroyed fibres - they were soft, rotten, would not hold their own weight. There was quite a pressure in tube, & when tip was broken off, sheet of plastic & many bubbles rose from around fibres.

over

Tube of Caustic Potash + Water:—

Tube contained Solution 20% Caustic Potash in H_2O. Found fibre almost entirely dissolved:

Tube of Nitric acid + Water:—

Tube contained 5% solution of HNO_3 in H_2O. Found the main of fibre somewhat dissolved. When treated they splintered — hospasp into elementary fibres

Tube of Sulphuric Acid + Water:—

Tube contained 5% solution of H_2SO_4 in H_2O. Resin of fibre slightly affected.

Fibres in tubes containing Iodoform Sugar, Sugar + H_2O were not attacked

Arthur C. Payne.

Order Numbers.

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